

## REMARKS

Claims 1-87 are pending. Claims 1-4, 6-7, 19, 27-29, 33-34, 36, 43, 49, 59, 68-69, 76, 78, 84 and 86 are amended to more particularly point out and distinctly claim Applicants' invention.

The Examiner objected to the Specification because the references to co-pending application did not include their respective serial numbers. As amended, the Examiner's objection is believed overcome.

### Claim objections

The Examiner objected to informalities in the claims. Except as noted in the following, all the informalities are corrected. Not all the Examiner's suggested corrections are made because:

(a) the Examiner's objections with respect to Claim 2, lines 12, 16, 46, 48-49, 51 and 58, are believed incorrect;

(b) the Examiner's objections with respect to Claim 59, lines 22 and 26, are believed incorrect;

(c) the Examiner's objections with respect to Claim 76, lines 2 and 7, are believed incorrect; and

(d) the Examiner's objection with respect to Claim 86, line 2, is believed incorrect.

### Objection to the Drawings and Rejection of Claims under 35 U.S.C. § 112, first paragraph

The Examiner objected to the drawings, stating that the method steps recited in Claims 4, 7 and 59 are not shown. Based on substantially the same basis, the Examiner rejected Claims 4-18 and 59-87 under 35 U.S.C. § 112, first paragraph, as failing to comply with the

written description requirement. The Examiner states that Claims 4, 7 and 59 do not recite the steps illustrated by Figs. 2A and 2B.

Applicants respectfully traverse the Examiner's objection to the drawings and the Examiner's rejection of Claims 4-18 and 59-87. With respect to Claim 4, the corresponding steps in Figs. 2A and 2B are set forth in the following table:

Claim 4	Support in Figs 2A and 2B
step A: defining a first set of frequencies and a second set of frequencies;	Steps 200 and 204
step B: defining a first set of data blocks and a second set of data blocks, wherein; each set of data blocks make up the sampled data;	Step 206
step C: defining a first pair of data block-frequency set, wherein: the first pair of data block-frequency set comprises the first set of data blocks and the first set of frequencies;	Steps 206, "corresponding to the coarse grain frequency bins"
step D: defining a second pair of data block-frequency set, wherein: the second pair of data block-frequency set comprises the second set of data blocks and the second set of frequencies;	Steps 204 and 206
step E: selecting the first pair of data block-frequency set;	Step 210
step F: for each data block in the first pair of data block-frequency set, calculating a pair of I and Q correlation integrals at each frequency in the first pair of data block-frequency sets to produce a corresponding pair of I and Q correlation values;	Step 220
step G: from the second pair of data block-frequency set, selecting one data block that has not been previously selected from the second pair of data block-frequency sets to be a selected data block and performing the steps of:	Step 222, selecting a hypothesized delay value.
step H: from the first pair of	Step 222, identifying all data blocks

data block-frequency set, identifying a subset of data blocks that make up the selected data block;	corresponding to the selected “hypothesized delay value.”
step I: selecting a frequency that has not been previously selected from the second pair of data block-frequency set to be a target frequency;	Step 222, taking a frequency “in each fine grain frequency bin” one by one
step J: from the first pair of data block-frequency set, identifying a frequency that is close in value to the target frequency to be an identified frequency;	Step 222, finding a frequency in the first data-block frequency set, so that the corresponding I and Q correlation sums can be identified, in order to achieve “without recalculating I and Q correlation sums”.
step K: selecting pairs of I and Q correlation values that correspond to the subset of data blocks from the first pair of data block-frequency set to be the selected pairs of I and Q correlation values;	Step 222, implemented using the steps 840 and 850 of Figure 6, which are described on page 31, lines 6-16.
step L: for the selected data block, weighting the selected pairs of I and Q correlation values with weights to form weighted pairs of I and Q values;	Step 222, “Sum I AND Q correlation blocks”
step M: summing the weighted pairs of I and Q values over the selected data block to form weighted sums of I and Q values; <u>and</u>	Step 222, continue to “Sum I and Q correlation blocks over all the data blocks”
step N: repeating steps I through N until all the frequencies from the current pair of data block-frequency sets have been selected to be the target frequency; and	Step 222, repeatedly choosing frequencies until all frequencies in all “fine grain frequency bins” are processed.
step O: repeating steps G through O until all the data blocks from the second pair of data block-frequency set have been selected to be the selected data block.	Step 222, repeating steps G to O to process all hypothesized delay values.

Similarly, with respect to Claim 7, the corresponding steps in Figs. 2A and 2B are set forth in the following table:

Claim 7	Support in Figs. 2A and 2B
receiving sampled data associated with a received signal; dividing a range of frequency of interest into a first set of frequency intervals and a second set of frequency intervals;	Step 204
dividing the sampled data into a set of data blocks based on the first set of frequency intervals;	Step 206
for each data block of the set of blocks of data, calculating I and Q correlation integrals associated with the sampled data at one representative frequency from each frequency interval in the first set of frequency intervals;	Step 220
for every frequency interval of the second set of frequency intervals, determining a selected frequency in the first set of frequency intervals, wherein the selected frequency is close in value to the target frequency;	Step 222, identifying the suitable frequency in the first frequency interval, whose I and Q correlation sums can be reused (i.e., "without recalculating I and Q correlation sums).
selecting I and Q correlation integrals corresponding to each selected frequency to be a selected pair of I and Q correlation values;	Step 222, selecting the corresponding "I and Q correlation sums"
weighting the selected pairs of I and Q correlation values according to a set of characteristics to produce a set of weighted pairs of I and Q correlation values; and	Step 222, preparing the I and Q correlation for summing "over all hypothesized delay value" properly. (This step is inherent in "without re-calculating I and Q correlation sums")
summing the weighted pairs of I and Q correlation values at the target frequency.	Step 222, "[summing] I and Q correlation sums over all data blocks."
<p>Similarly, with respect to Claim 59, the corresponding steps in Figs. 2A and 2B are set forth in the following table:</p>	
Claim 59	Support in Figs. 2A and 2B
receiving data associated with a received signal;	Inherent step that prepares the "sampled signal" in Step 206

Determining a frequency range of interest;	Step 202
Determining a set of coarse frequencies within the frequency range of interest;	Step 204 (i)
determining a set of fine frequencies within the frequency range of interest;	Step 204 (ii)
dividing the data into a set of data blocks;	Step 206
for each data block of the set of data blocks, calculating I and Q correlation values associated with the data at each frequency from the set of coarse frequencies;	Step 220
for every frequency of the set of fine frequencies, determining a selected frequency in the set of coarse frequencies, wherein the selected frequency is close in value to the frequency in the set of fine frequencies;	Step 222, identifying a coarse frequency close to each of the fine frequencies, so as to identify the correlation sums that can be reused (i.e., "without re-calculating I and Q correlation sums").
for each data block of the set of data blocks, selecting I and Q correlation values corresponding to each coarse frequency to be the selected I and Q correlation values for the corresponding data block and coarse frequency;	Step 222, select I and Q correlation sums corresponding to the coarse frequency identified.
selecting weights for the selected I and Q correlation values, based on a difference of between a frequency in the set of fine frequencies and the corresponding selected frequency in the set of coarse frequencies, and also based on a position of the data block that corresponds to the selected pair of I and Q correlation values;	Step 222, determining how to prepare the I and Q correlation for summing "over all hypothesized delay value" properly.
weighting the selected pairs of I and Q correlation values according to the selected weights to produce weighted pairs of I and Q correlation values;	Step 222, applying "the I and Q correlation for summing "over all hypothesized delay value" properly. (This step is inherent in "without re-calculating I and Q correlation sums")
computing an approximation to the I and Q correlation integrals over the entire data associated with the received signal, for each frequency in the set of fine frequencies, using the weighted pairs of I and Q correlation values; and	Step 222, "[summing] I and Q correlation sums over all data blocks"

estimating the carrier frequency from within the set of fine frequencies by using the approximations to the I and Q correlation integrals at the frequencies in the set of fine frequencies.

Steps 880 and 950 of Figure 1B.

Thus, since Claims 4, 7 and 59 are each supported by the drawings and the Specification, Applicants respectfully submit that the Examiner's objection to the drawings is erroneous and Claims 4, 7 and 59 and their respective dependent Claims 4-6, 8-18 and 60-87 fully comply with 35 U.S.C. § 112, first paragraph.

Rejection of Claim under 35 U.S.C. § 112, Second Paragraph

The Examiner rejected Claim 6 under 35 U.S.C. § 112, second paragraph, as being indefinite. As amended, Claim 6 now depends from Claim 4, and thus the Examiner's rejection is believed overcome.

Conclusion

For the above reasons, Applicants believe that all claims (i.e., Claims 1-87) are allowable. If the Commissioner has any questions, the Commissioner is respectfully requested to telephone Applicants' attorney at (408) 392-9250.

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on May 25, 2005.



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Date of Signature

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